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PHOTOGRAPHIC INTERPRETATION REPORT

CHRONOLOGY OF THE ROCKET ENGINE TEST FACILITY KRASNOYARSK USSR

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CHRONOLOGY OF THE ROCKET ENGINE TEST FACILITY KRASNOYARSK, USSR

SUMMARY

The Rocket Engine Test Facility at Krasnoyarsk, USSR, contains 2 operational liquid propellant rocket engine test stands. It has probably been operational since the end of 1963, although the poor interpretability of early photography does not permit a definite verification of this.

Two probable diffuser tubes which protrude below the overhanging portion of Test Stand No 2 indicate that this stand probably contains 2 test positions and probably has an altitude simulation capability.

INTRODUCTION

The Krasnoyarsk Rocket Engine Test Facility is located at 56-06N 093-26E, 17 nautical miles (nm) east-northeast of Krasnoyarsk (Figures 1 and 2). This report consists of a chronology of the construction and descriptions of the more significant features within this facility. Table 1 and Figure 3 contain detailed descriptions, dimensions, and chronology of the structures located at the facility; all item numbers in the text refer to these figures.

Arms Plant Voroshilov 4 which is located approximately 15 nm to the southwest, may produce rocket engines or rocket engine components which are tested at the Krasnoyarsk facility.

The doubly fenced facility, which had approximately of roof cover in contains 2 rocket engine test stands (items 8 and 24), an air liquefaction plant (item 28), 2 probable cryogenic storage tanks (items 30 and 31), a possible engineering/laboratory building (item 49), 2 assembly/checkout buildings (items 20 and 21), and numerous other support structures.

The Rocket Engine Test Facility was not present on GENETRIX photography of , although some ground scarring was evident in the vicinity. The facility was first observed on photography of when it appeared to be still under construction. Subsequent photographic coverage of the facility through was used in preparing this report. It has often been of small scale and poor interpretability; thus, no chronology of the road, rail, or pipeline systems was attempted. However, was of good interpretability and permitted confirmation of previous functional interpretations of the facility. The latest photography, which was of small scale and poor interpretability, showed an area of extensive construction activity in the southeast portion of the facility (Figure 3). The construction activity consists of 5 or 6 structures, which may or may not include the early construction of an additional test stand, and extensive grading and ditching. The new construction activity could conceivably increase the builtup area of the facility by approximately 50 percent.

The roof cover of the facility was The roof cover increased by the following amounts: 133,375 sq ft from until

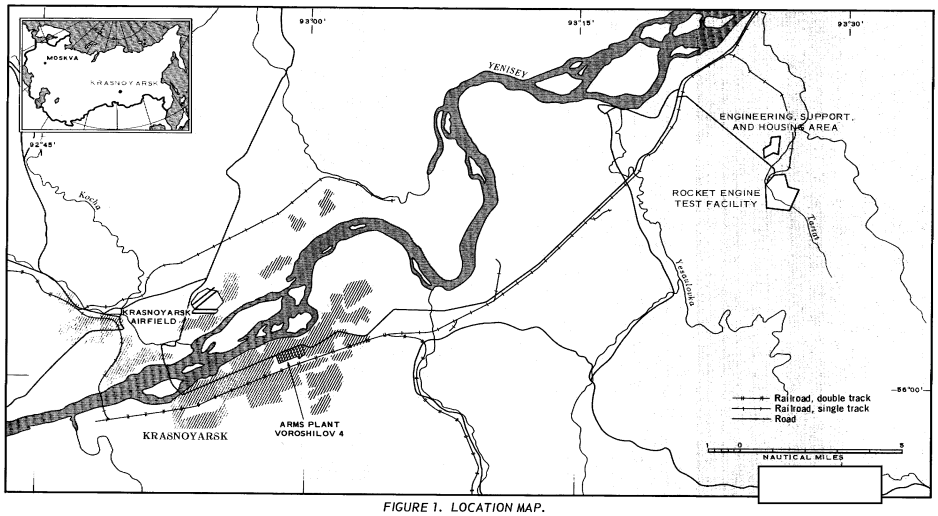

FIGURE 1. LOCATION MAP.

HIGHLIGHTS OF CHRONOLOGY OF THE ROCKET ENGINE TEST FACILITY

1961

photography of small scale and poor interpretability revealed the presence of the air liquefaction plant (item 28), an assembly/checkout building (item 21), the possible water purification and supply facility (items 3 and 4), 2 probable cryogenic storage tanks (items 30 and 31), the control building for Test Stand No 1 (item 6), 2 possible storage

FIGURE 2. ROCKET ENGINE TEST FACILITY, KRASNOYARSK, USSR.

buildings (items 32 and 38), a cooling rack (item 35), and Test Stand No 1 (item 24 and Figure 4) which was under construction. Roads and railroads/rail beds were also evident.

1962

photography of poor interpretability revealed the presence of a probable assembly building (item 19), a steam-plant (item 40), an assembly/checkout building (item 20), 2 administration buildings (items 41 and 60), an administration/engineering building (item 61), 14 support buildings, and 2 semiburied tanks.

1963

photography of fair interpretability on which the facility was snow covered showed Test Stand No 1 (item 24 and Figure 4) to be apparently complete. A possible fabrication building (item 48), which is similar to a building at the Rocket Engine Test Facility at Omsk, USSR, was complete. 2/ The fabrication building at Omsk has been identified as a possible fuels preparation/fabrication building. The configuration of both of these buildings suggests a fabrication function. However, the indications which suggest a possible fuel preparation function at the Omsk building are not present at the Krasnoyarsk building. A possible workshop (item 37), a possible support/test observation building (item 25), and 1 support building (item 47) were also complete.

1964

photography of fair interpretability revealed the presence of a rail-served possible shipping/receiving building (item 39), a probable well and pumphouse (item 14), 5 semiburied tanks, 1 possible buried tank (item 73), several small support buildings, and an administration/engineering building (item 42).

1965

The construction observed on photography of fair interpretability centered on the probable control building for Test Stand No 2 (item 9), a semiburied tank (item 12), a probable test observation building (item 7), and 2 support buildings.

1966

Stereo photography of good interpretability revealed the completion of Test Stand No 2 (item 8), the presence of 4 other support buildings, and 5 small tanks.

1967

photography in which was of fair interpretability, showed the addition of a second possible propellant unloading building (item 66) and an unidentified building (item 70). The latest photography of small scale and poor interpretability, showed extensive construction activity in the southeast part of the facility.

SIGNIFICANT FEATURES OF THE ROCKET ENGINE TEST FACILITY

Descriptions of the more significant features of the Rocket Engine Test Facility follow. These descriptions update information concerning this facility contained in an NPIC publication of 1/

TEST STAND NO 1

Test Stand No 1 (item 24 and Figure 4) was present on photography, but was not readily identifiable as a test stand until Construction was probably in its final stages in the test stand appeared to be complete in At that time, a discoloration was evident in the sump; however, no definite blast mark was visible. Photography of revealed possible blast marks on the flame deflector and in the sump. was of sufficently good interpretability to reveal the general configuration and the siting of the test stand. Stains on the flame deflector and in the sump were visible on photography of an unusual pattern of stains and melted snow was visible on the flame deflector and in the sump, but there was no evidence of blast marks on the surrounding terrain. In the hillside surrounding the flame deflector and sump was eroded and scarred.

Test Stand No 1 is very similar to test stands located at the rocket engine test facilities at Kurumoch and Perm. The stand at Krasnoyarsk is built into the slope to a greater degree than those at Perm and Kurumoch and, therefore, is less freestanding. The article to be tested is mounted in the projection which overhangs the flame deflector and partially covers the width of the test stand. The projection measures

The stand apparently has a single firing position. An access ramp spans the narrow gap between the stand and the slope and enters the center of the rear of the stand at a level approximately below the top of the stand and apparently near the level of the bottom of the overhanging projection. The main structure of the stand measures 85 by 70 feet and rises approximately above the point where the test stand is dug into the slope at the front and 205 feet above the sump. A control building (item 6) is situated on a bluff approximately 550 feet west of the test stand. A pipeline probably supplies propellant to a small probable propellants storage building (item 23) which is near the test stand. A large semiburied tank near the test stand may provide the necessary volume of water for cooling the blast deflector.

A rail spur, probably of narrow gauge, extends from the larger of the assembly/checkout buildings (item 21) to the test stand. An object resembling a possible missile component observed at the Kurumoch Rocket Engine Test Facility was observed on this track on photography of 3/

TEST STAND NO 2

Test Stand No 2 (item 8 and Figure 5) was not present on photography of photography revealed very early signs of preliminary grading at the site; and photography revealed the beginnings of an excavation for the blast pit and flame deflector. Continuing construction was evident on 1965 photography. By the test stand was nearing completion, but was possibly still incomplete in The test stand appeared to be complete by

Two probable diffusers protrude below the overhanging portion of the test stand indicating that it probably contains 2 test positions. The larger probable diffuser is estimated to be 20 feet long. A construction crane is positioned on the embankment near the larger probable diffuser. The taller rear section of the stand rises above grade. The

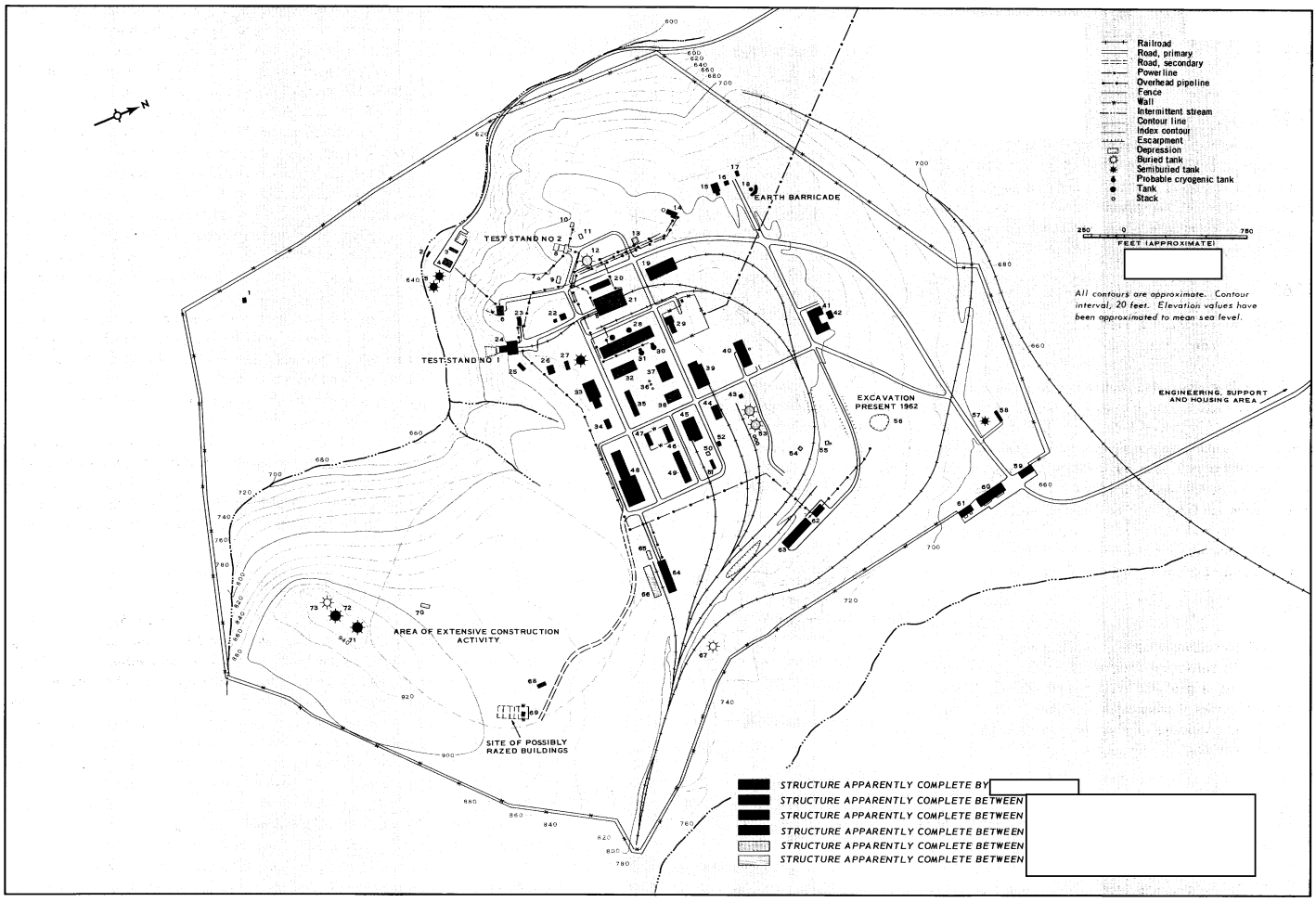

FIGURE 3. LAYOUT OF THE ROCKET ENGINE TEST FACILITY.

Table 1. Rocket Engine Test Facility, Krasnoyarsk, USSR
(Table is keyed to Figure 3)

Item No	Function/Description	Dimensions* (ft) L	W	H	Roof Cover (sq ft)	Date First Observed & Apparently Complete (unless otherwise noted)	Comments
1	Unidentified bldg						
2	Support bldg						
3	Poss water treatment & supply bldg						May possibly not be present until [redacted]
4	Poss water treatment & supply bldg						May possibly not be present until [redacted]
5	Semiburied tanks (2)						Measurements include mound
6	Control bldg for Test Stand No 1**						
7	Prob test observation bldg						
8	Test Stand No 2**						First observed u/c [redacted]
9	Prob control bldg for Test Stand No 2**						
10	Support/test observation bldg						
11	Support bldg						
12	Semiburied tank						First observed u/c [redacted] measurements include mound
13	Support bldg						
14	Prob well & pumphouse**						
15	Support bldg						
16	Support bldg						
17	Support bldg						Not measured
18	Poss sensitive storage bldg						
19	Prob assembly bldg**						Rail served
20	Assembly/checkout bldg**						
21	Assembly/checkout bldg**						Rail served
22	Support/test observation bldg						Includes bldg on south side which measures [redacted]
23	Small prob propellants storage bldg**						
24	Test Stand No 1**						First observed u/c [redacted]
25	Poss support/test observation bldg						
26	Poss support/test observation bldg						
27	Support bldg						Includes buried tank on north side completed [redacted] which measures [redacted] in diameter; measurements include mound
28	Air liquefaction plant**						A pipeline from this bldg extends west to a rail spur where LOX transporters are probably loaded
29	Prob switchhouse						A small bldg (aprx 15 x 20 ft) is also located within the substation
30	Prob cryogenic storage tank**						
31	Prob cryogenic storage tank**						
32	Poss storage bldg**						
33	Support bldg**						
34	Support bldg						
35	Cooling rack**						
36	Pressure tanks (3)						Not measured
37	Poss workshop**						
38	Poss storage bldg**						
39	Poss shipping/ receiving bldg**						Rail served
40	Steamplant**						
41	Admin bldg**						
42	Admin/engineering bldg						
43	Support bldg						
44	Support bldg						Rail served
45	Poss shipping/receiving bldg**						Rail served
46	Poss storage bldg						
47	Poss storage bldg						
48	Poss fabrication bldg**						
49	Poss engineering/lab bldg						
50	Support bldg						
51	Support bldg						
52	Support bldg						
53	Tanks (5)						Not measured; 2 tanks definitely buried; the 3 smaller tanks may also be buried
54	Support bldg						
55	Support bldg						
56	Excavation						Apparently an excavation for a tank; no tank is emplaced
57	Semiburied tank						Measurements include mound
58	Support bldg						
59	Prob shop/maintenance bldg						
60	Admin bldg**						
61	Admin/engineering bldg						
62	Transloading & storage bldg**						Rail served
63	Poss propellant unloading bldg**						Rail served
64	Poss propellant unloading bldg**						Rail served
65	Support bldg						Rail served
66	Poss propellant unloading bldg						Rail served
67	Buried tank						Not measured
68	Unidentified bldg						
69	Unidentified bldg						Bldg enclosed within a wall; other bldgs within the wall have apparently been razed
70	Unidentified bldg						
71	Semiburied tank						Measurements include mound
72	Buried tank						Was emplaced, but not covered on [redacted] measurements include mound
73	Poss buried tank						Since removed

*All lengths & widths are overall measurements; all heights are to the highest point of the structure; test stands are measured from the highest point of the superstructure.

**Measurement for this structure supplied by NPIC/TID: Horizontal measurement ±5 feet or 5%, whichever is greater; vertical measurement ±10 feet; all other measurements estimated by the analyst.

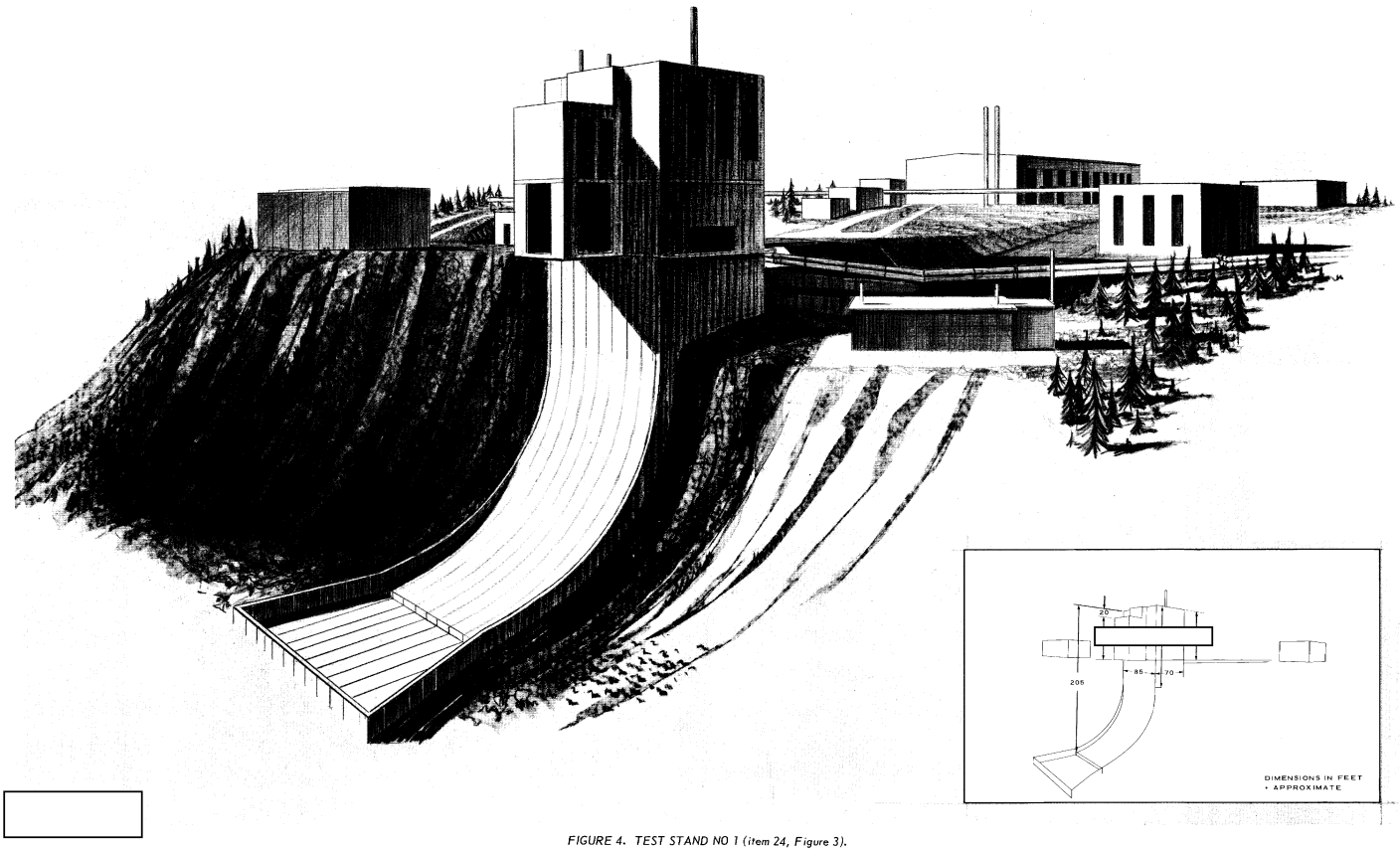

FIGURE 4. TEST STAND NO 1 (item 24, Figure 3).

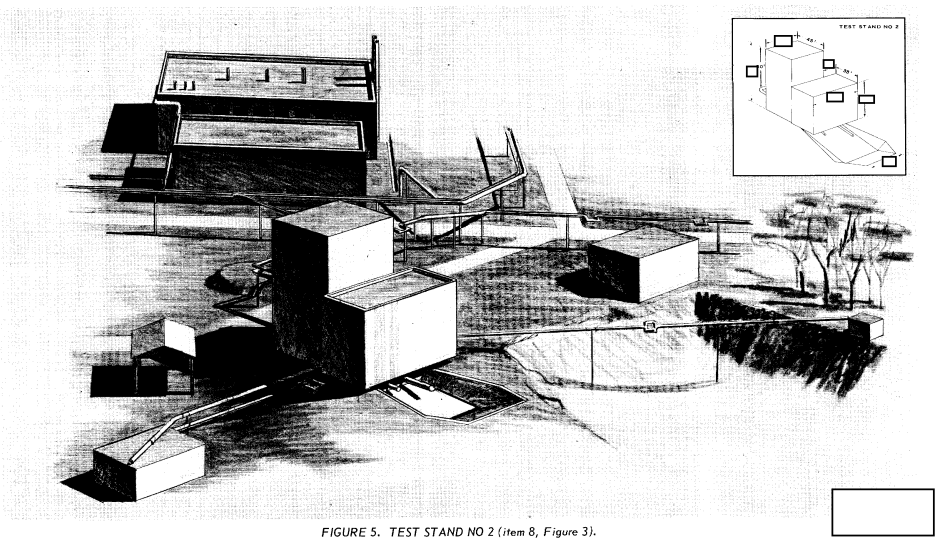

FIGURE 5. TEST STAND NO 2 (item 8, Figure 3).

rear section measures . A large pipeline enters the section 50 feet below the top. The front portion of the stand, which overhangs the flame deflector, measures and is . The blast pit and flame deflector slope downward for at least 50 feet to their deepest point, which is 45 feet wide, and then rise approximately (a slope distance of approximately where the flame deflector narrows to approximately .

A probable control building (item 9) is situated on an embankment south-southeast of the stand. Three other small structures and a semiburied tank are nearby.

Test Stand No 2 is probably designed for test firing upper stage rocket engines and/or engine components and probably has an altitude simulation capability. It does not closely resemble any other known Soviet test stands.

POSSIBLE WATER TREATMENT AND SUPPLY FACILITY

The possible water treatment and supply facility, which contains 2 buildings (items 3 and 4), is connected to the control building for Test Stand No 1 (item 6) by a small pipeline. A sump or open basin is on the northwest side of the northernmost water treatment and supply building.

The poor access to the rest of the Rocket Engine Test Facility suggests an operation to which limited access is desirable or that the facilities are not necessarily directly related to the test facility.

Four other possible functions for this facility are mentioned below in the order of their probability:

1. Possible calibration testing. Calibration testing is conducted on a rocket engine or rocket engine component to ensure that at least the specific performance will be obtained when the engine is fired operationally. For safety reasons, water or some other nonreactive liquid is usually substituted for at least one of the propellants that passes through the thrust chamber assembly.
2. Possible effluent treatment. An effluent treatment facility would gather and treat or clean the effluent exhausted from the stand during a test. Photography of on which the facility was snow covered, shows the deflector of Test Stand No 1 to be clear of snow and the sump of the possible water treatment and supply facility still snow covered. This suggests that the 2 sumps are not necessarily connected.
3. Possible horizontal testing.
4. Possible testing of toxic propellants.

PIPELINES

Three large probable water lines (Figure 3) emanate from the probable well and pumphouse (item 14). One leads to Test Stand No 2 (item 8) and the air liquefaction plant (item 28). A second line apparently goes underground between the assembly/checkout buildings (items 20 and 21) and Test Stand No 1 (item 24). The third line leads to the same assembly/checkout building. A pipeline which could carry water, steam, or electrical connections runs between the control building for Test Stand No 1 (item 6) and the possible water treatment and supply facility (items 3 and 4).

Numerous aboveground pipelines are evident throughout the facility. The photography suggests that the lines between items 23 and 62 and 63 are pipe galleries possibly carrying fuel, air, or steam. A ground scar between items 71, 72, and 73, and the possible propellant unloading building, item 63, suggests that fuel lines are buried there.

ENGINEERING, SUPPORT, AND HOUSING AREA

The engineering and support section (Figure 1) contains 14 low, single-story shop- and maintenance-type buildings with a combined roof cover of approximately 110,975 square feet.

The housing section contains 97 buildings with a total roof cover of approximately 685,460 square feet. The buildings consist of 3 warehouses, a garage, a heating plant, a possible messhall, a possible recreational facility, and a supply/support area. The remaining buildings are single or multiple family dwellings. A substation serves the area.

REFERENCES

MAPS OR CHARTS

ACIC. Series 200, Scale 1:200,000, Sheet 0159-23

DOCUMENTS

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2. NPIC. *Omsk Rocket Engine Test Facility, USSR,* Aug 66 (TOP SECRET
3. NPIC. *Chronology of Rocket Engine Test Facility, Kurumoch, USSR,* Feb 68 (TOP SECRET

REQUIREMENT

CIA. C-DI5-82,973

NPIC PROJECT

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